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February 20, 2018

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: *Ex parte* presentation in IB Docket No. 11-109

Dear Ms. Dortch:

On February 15, 2018, Doug Smith, Chief Executive Officer of Ligado Networks LLC ("Ligado"), Justin Lilley, consultant to Ligado, and the undersigned, counsel to Ligado, met with Commissioner Carr and Will Adams, Legal Advisor to Commissioner Carr. On February 20, 2018, Messrs. Smith and Waldron met with Commissioner Rosenworcel and Umair Javed, Wireless and International Legal Advisor to Commissioner Rosenworcel. In both meetings, the parties discussed the status of Ligado's license modification applications and petition for rulemaking to reallocate the 1675-1680 MHz band for shared commercial use. In that connection, the Ligado Representatives presented the attached slide deck, which explains the benefits of granting Ligado's license modification applications and issuing the petition for rulemaking.

Sincerely,

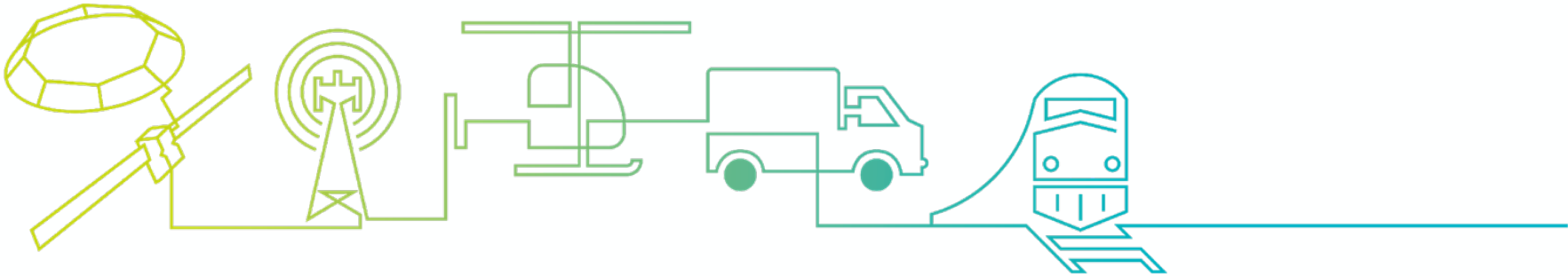
/s/ Gerard J. Waldron
Gerard J. Waldron
Counsel to Ligado Networks LLC

Attachment

cc: Commissioner Carr
Commissioner Rosenworcel
Umair Javed
Will Adams

Ligado Meeting with Commissioners Carr and Rosenworcel

FEBRUARY 2018



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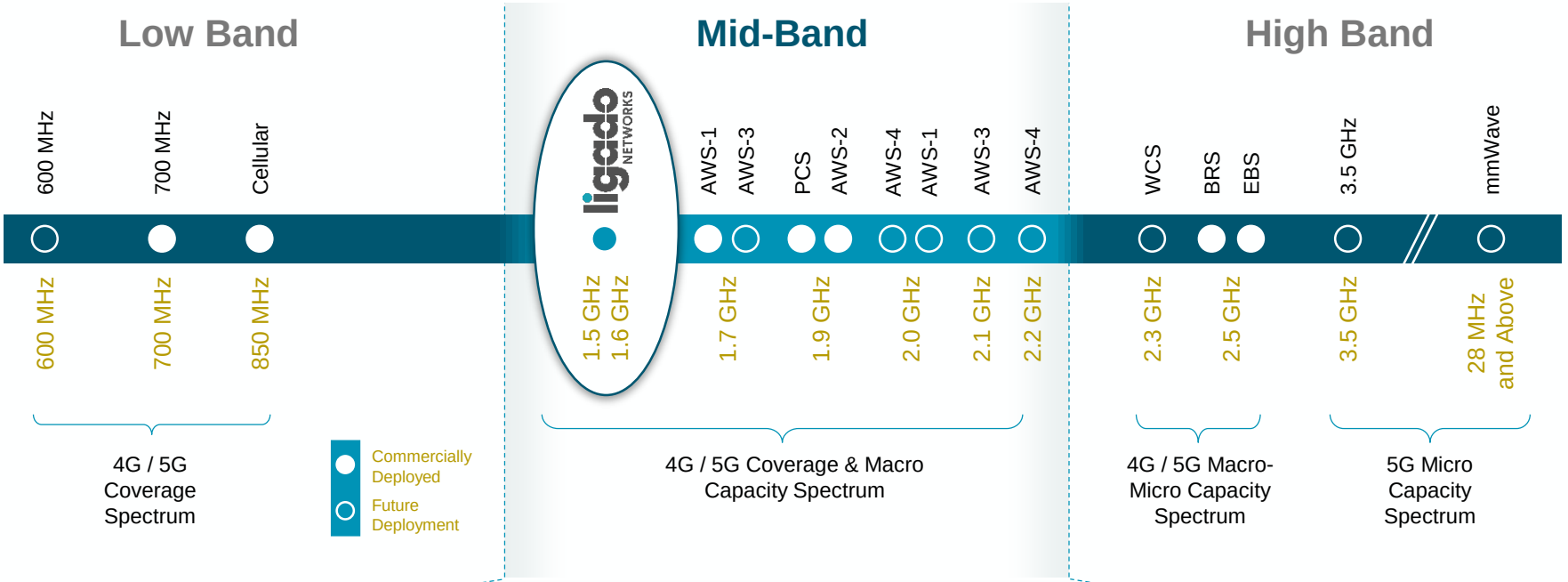
Mid-Band Spectrum: Most Flexible Spectrum for Today's and Tomorrow's Uses

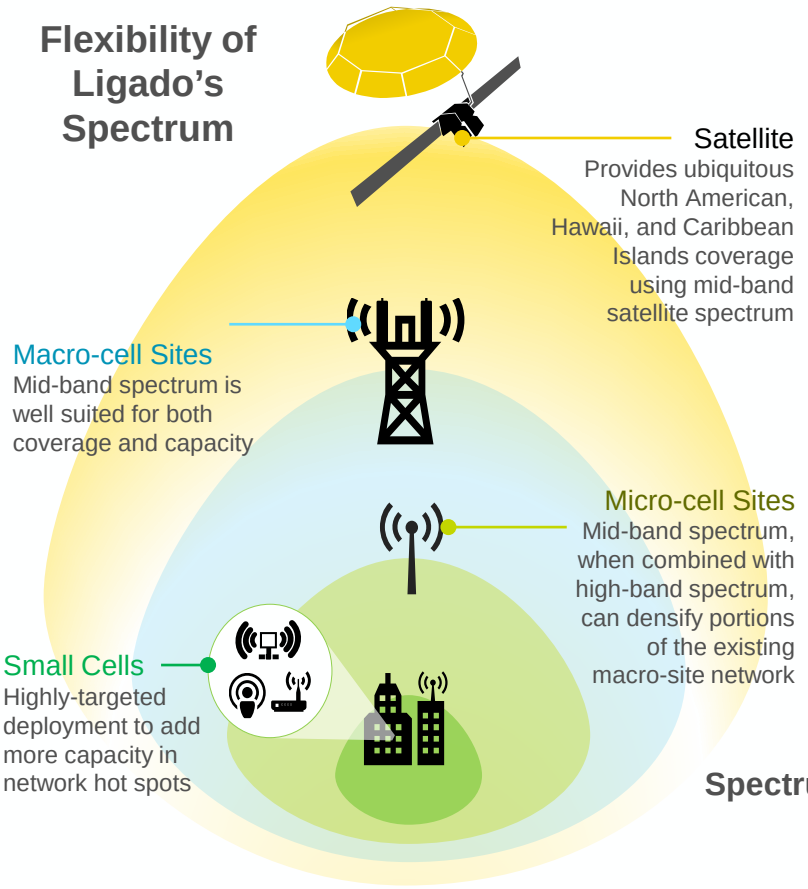


KEY FEATURES

Optimal Balance of Coverage and Capacity	Rapid and Easy Ecosystem Adoption	Globally Coordinated L-band

Ligado's roadmap can deliver 40 MHz of mid-band spectrum
for deployment in both existing and next-generation mobile networks

Approval of Ligado's Proposal Would Make 40 MHz of Mid-Band Spectrum Available for 5G and IOT



Spectrum Band Use for Private Networks

	Satellite	Macro	Micro	Small Cell
Ligado Networks	✔☐	✔☐	✔☐	✔☐

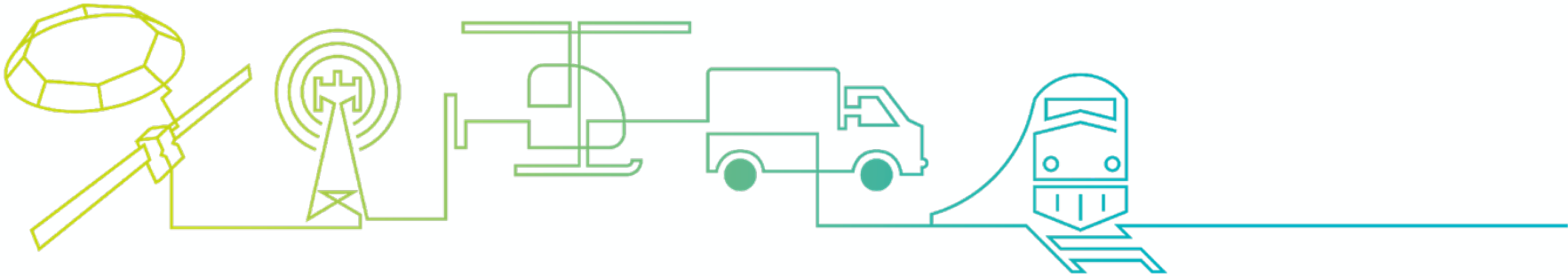
The flexibility of Ligado's spectrum makes it the ideal band to catalyze the build-out of custom private networks

Ligado's Approach Can Meet the Key Requirements of the IIoT Market

Our combined approach to technology and network deployment can accelerate advanced capabilities for emerging 5G and critical IoT use cases

Ligado's License Modification Proceeding

FILED DECEMBER 31, 2015



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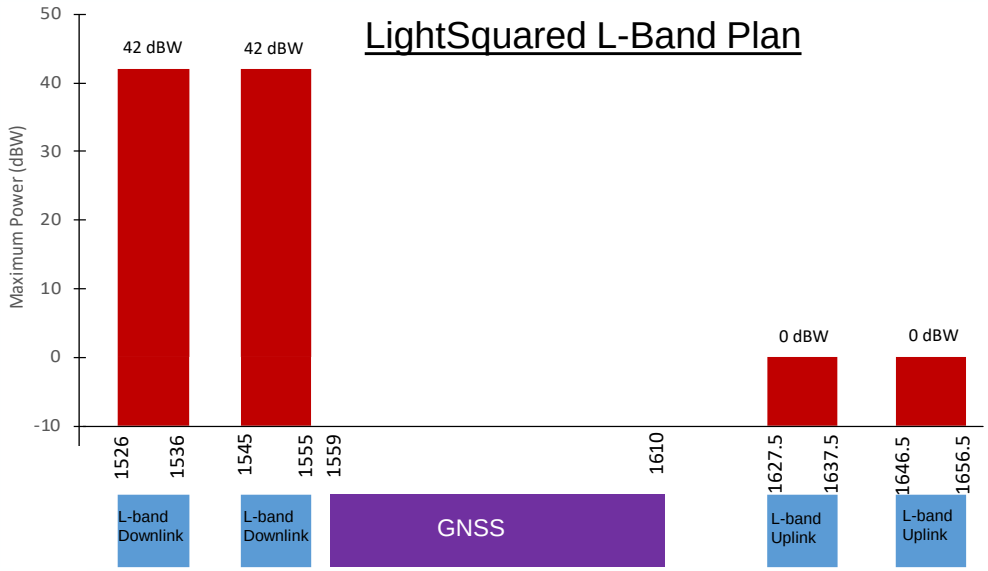
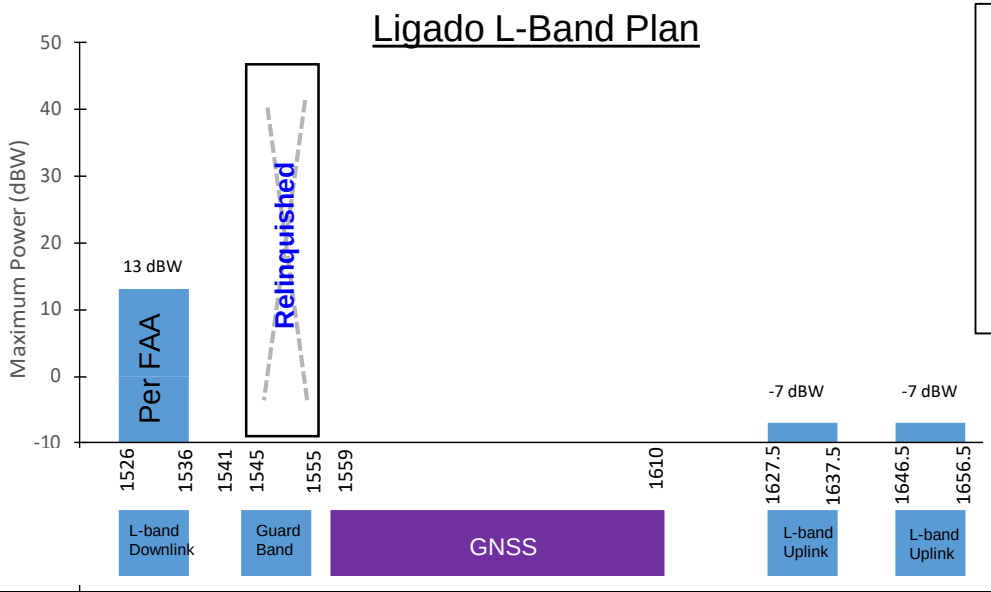
Ligado Has Dramatically Revised Its Plan to Protect GPS – and the GPS Companies Agree



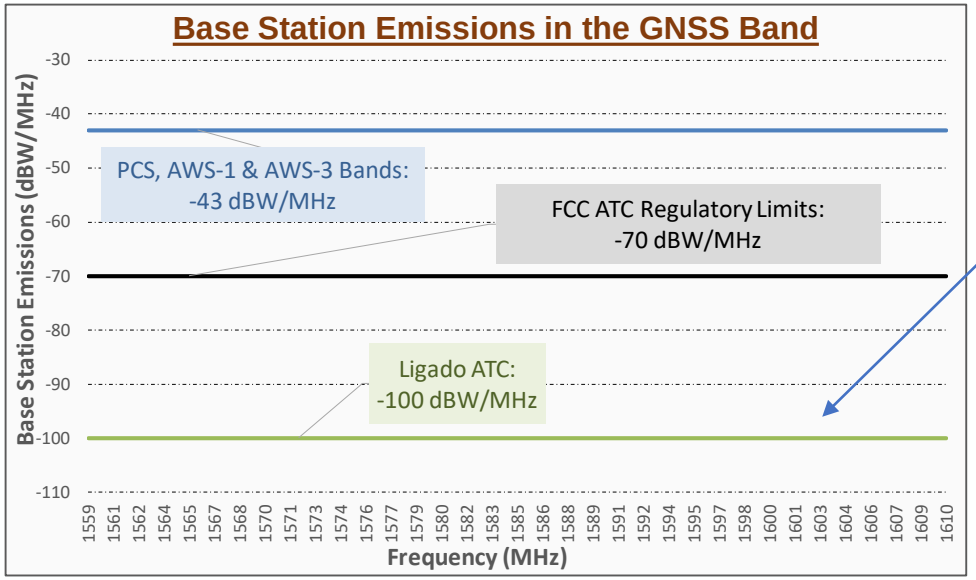


Current Plan Protects GPS:

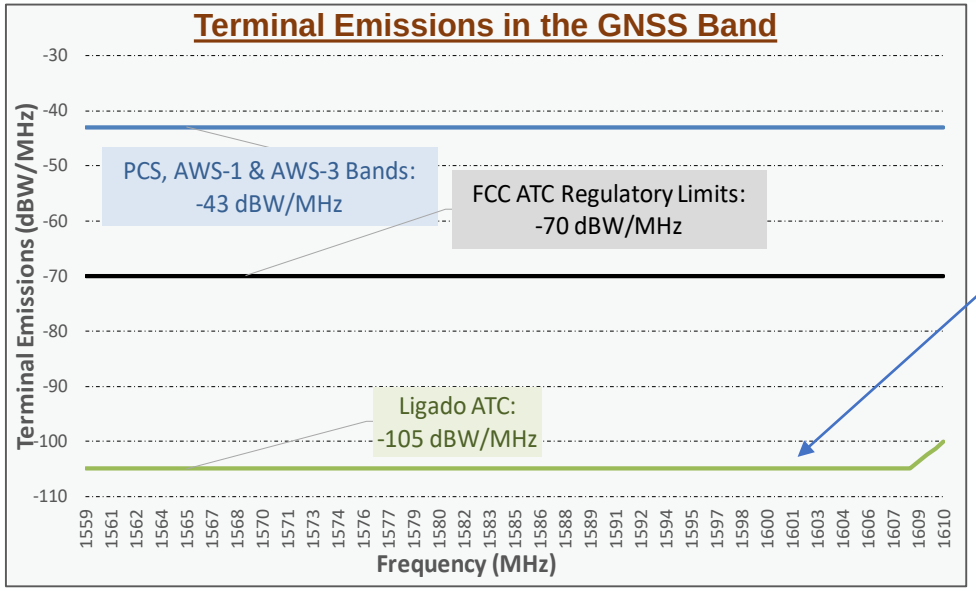
- Lower power in all channels
- Guardband created by Ligado to expand spectrum available for use by GPS (1545-1555 MHz)
- Certified aviation devices (safety of life) protected at 13 dBW per FAA

Distances Between Spectrum Bands Are Not To Scale

Ligado Has Also Agreed to Lower Its Out-of-Band Emissions into the GNSS Band Far Below Those of Any Other Spectrum User



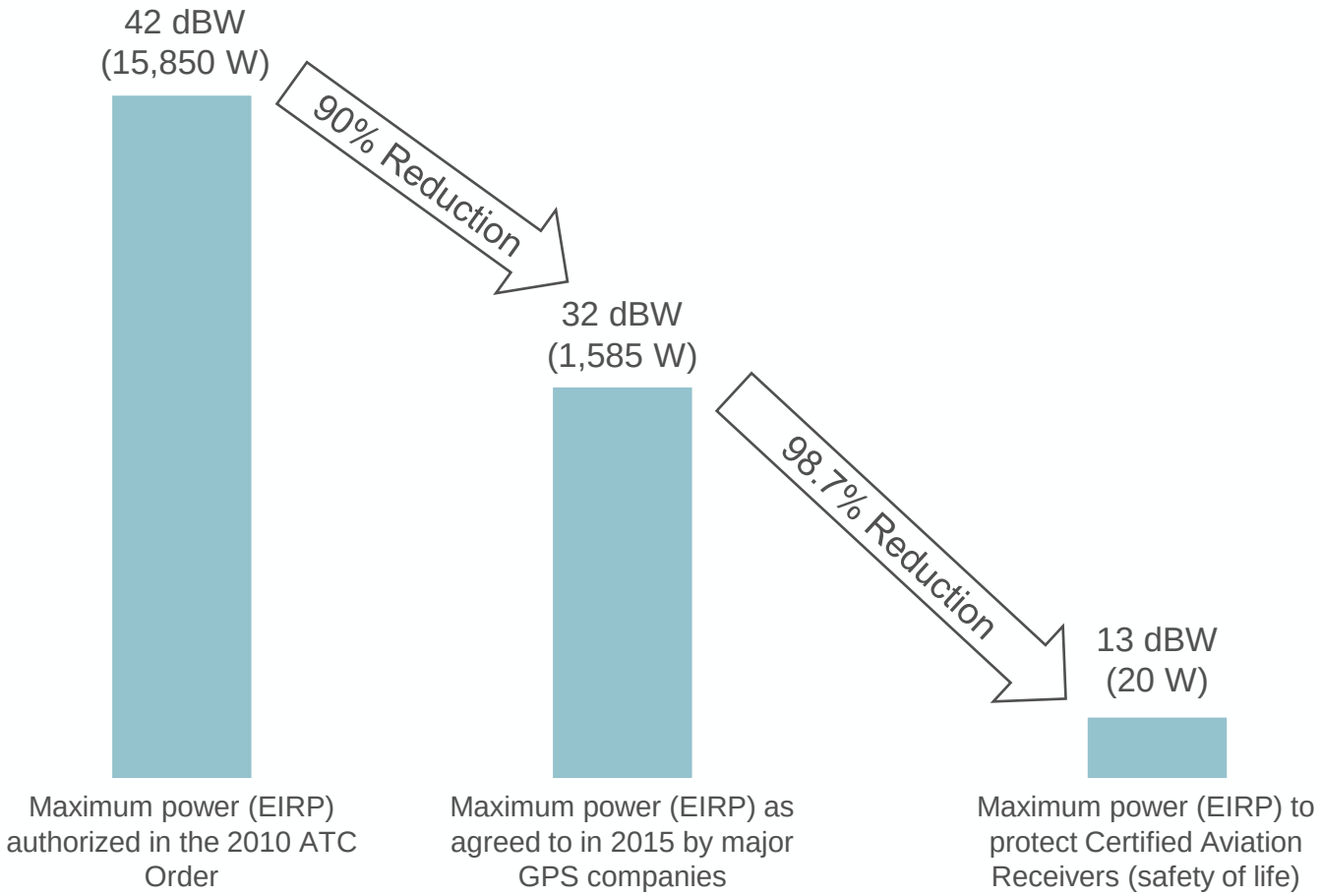
Our base station emissions into the GNSS band are significantly lower than base station emissions from other band users and are also well below FCC regulatory requirements



Our user terminal emissions into the GNSS band are significantly lower than terminal emissions from other band users and are also well below FCC regulatory requirements

Ligado Has Dramatically Reduced Its Downlink Power to Protect GNSS

Ligado has already significantly decreased its power (EIRP) for the 1526 – 1536 MHz downlink channel



The GPS Companies Recognize that the Ligado Plan Protects GPS

GARMIN	"Garmin spokeswoman Carly Hysell said [Ligado's] agreement to cut out-of-band emissions and power levels in the spectrum band closest to the GPS signal protects the interests of GPS users, and the company doesn't anticipate any performance-degradation issues for those using GPS technologies." Wall Street Journal (Dec. 17, 2015)
JOHN DEERE	"Deere herein confirms that it does not oppose grant of the Modification Application, as proposed, that would incorporate the full set of technical parameters and licensing conditions…." Deere Reply Comments (June 21, 2016)
Trimble	"Trimble continues to support the adoption of the Agreed License Conditions …. Taken as a whole, the Agreed License Conditions represent a compromise which balances the competing public policy interests raised by Ligado's proposed use of its licensed spectrum." Trimble Reply Comments (June 21, 2016)
NovAtel	"We are pleased to report that after considerable discussion and analysis [NovAtel and Ligado] have reached a co-existence agreement which calls for future coordination…. On the basis of this understanding, NovAtel supports Commission granting of the modification applications." Joint NovAtel/Ligado Ex Parte Filing (June 27, 2016)
TOPCON	"Over the past many months, we've worked closely with Ligado to conduct a thorough analysis. We've agreed that the parties will cooperate in the future if their proposal impacts TopCon's operations in any way. Our agreement is a positive step forward for both companies, and we look forward to coordinating with Ligado over the coming years as it deploys a ground network." Chief Strategy Officer Ivan Di Federico, Press Release (Dec. 6, 2016)

Ligado's Plan Protects All Classes of GPS Devices

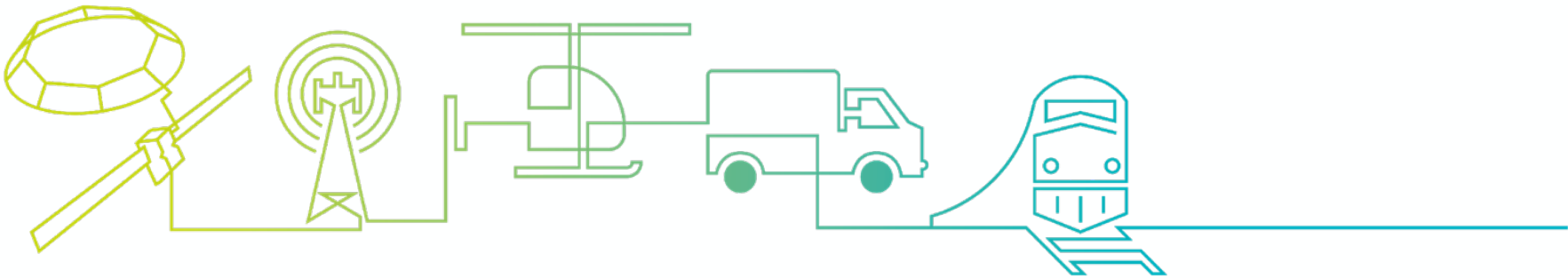
- All cellular devices are protected
- All timing receivers are protected
- All certified aviation devices are protected
- All space based receivers are protected
- Almost all GLN devices are protected
- High Precision (HPR) is the most sensitive category of receiver
  - Even DOT testing, which uses a flawed metric of 1 dB change in C/No, indicates that many of these devices are compatible with Ligado's plan (Testing at NIST demonstrated that 1 dB change does not equate to a loss of position accuracy)
  - If some of the under-performing HP devices need better protection, these HPR devices can be properly filtered to co-exist with Ligado or replaced
- Deere, Trimble, Garmin, Topcon & NovAtel recognize that the Ligado Plan protects GPS

Conclusion: Ligado's Spectrum Plan Provides Ample Protection to GPS

- NASCTN test results ***and*** DOT test results show that every category of GPS devices has devices that are unaffected by Ligado's operations
- Ligado has already reduced its transmit power in all of its spectrum bands to levels low enough to protect all certified aviation devices and allow most other GPS devices to continue to use our band unimpeded
- Government should not overregulate the spectrum and impose onerous burdens to protect the worst-performing devices; instead, the government should find more tailored and efficient methods. Ligado has shown a willingness to do just that.

NPRM to Reallocate 1675-1680 MHz to Shared Commercial Use

PUBLIC NOTICE ISSUED APRIL 22, 2016



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FY 2019 President's Budget Request: Administration Policy Supports Auction of the Spectrum

- FY 2019 President's Budget request:

  The Budget proposes that the FCC either auction or use fee authority to assign spectrum frequencies between 1675-1680 megahertz for flexible use by 2020, subject to sharing arrangements with Federal weather satellites. Currently, the spectrum is being used for radiosondes (weather balloons), weather satellite downlinks, and data broadcasts, and the band will also support future weather satellite operations. The National Oceanic and Atmospheric Administration (NOAA) began transitioning radiosondes operations out of the band in 2016 as part of the Advanced Wireless Services 3 (AWS-3) relocation process. If this proposal is enacted, NOAA would establish limited protection zones for the remaining weather satellite downlinks and develop alternative data broadcast systems for users of its data products. Without this proposal, these frequencies are unlikely to be auctioned and repurposed to commercial use. The proposal is expected to raise $600 million in receipts over 10 years.

- Language nearly identical to FY 2018 President's Budget request

Background on the Proposal to Share 1675-1680 MHz

- In 2013, the band at 1675-1680 MHz was first identified in the President's budget (for FY 2014) as suitable for sharing by NOAA with commercial use; the spectrum has been directed to be auctioned in every budget since then
- Given its proximity to and compatibility with Ligado's L-band spectrum, Ligado immediately expressed an interest in eventually securing the right to share the spectrum with NOAA and began to engage with NOAA and other stakeholders to work collaboratively to identify next steps
- Because protecting NOAA's mission was critical to any sharing proposal, the first step was to understand the ways in which NOAA utilized the spectrum
- NOAA's uses were identified to be:
  - Radiosondes
  - Transmission to NOAA earth stations of critical weather data from the GOES satellite system
  - Transmission to roughly 100 non-NOAA users of critical weather data from the GOES satellite system
- Once the uses were identified, work began to evaluate the feasibility of protecting those important functions while sharing the spectrum
- After extensive study, it was determined that
  - The radiosondes could be relocated out of this spectrum; that process is nearly complete
  - Transmission to NOAA earth stations of critical weather data from the GOES satellite system could continue unimpeded through the creation of geographic protection zones
  - Transmission to non-NOAA users could be achieved through the creation of a new content delivery network (CDN) that would reduce cost to receive such data and make it available to many more users
- Ligado announced its commitment to protect NOAA's critical operations and began to develop workable solutions and committed to funding them as conditions to any commercial sharing license

Summary: 1675-1680 MHz Can Be Shared Without Impeding NOAA's Mission and Delivery of Important Weather Data

- The Alion Study in the record concluded that NOAA's operations and its ability to receive all of the data that is transmitted from both the GOES-N and GOES-R series satellites can be protected by the creation of geographic protection zones
- The Study relied on the participation of several NOAA teams, including its spectrum management office and key personnel from its GOES-R team
- The Study's findings and recommendations were shared with Congress, the NTIA, the FCC and other stakeholders; Ligado is not aware of anyone challenging these findings or offering alternative assessments
- The distribution of the same critical data to non-NOAA users can also be protected and continue unimpeded
  - Ligado has demonstrated that GRB data can be reliably retransmitted using a cloud-based content delivery network (CDN) that has significant advantages over direct reception from GOES-R series satellites, including:
    - → *De minimis* upfront costs for end users
    - → No requirement for the siting, installation and maintenance of a large satellite dish
    - → The ability to store and retrieve archived data through the same system
  - Reliability, latency and capacity requirements can be met by the CDN
  - Costs associated with the CDN can be imposed by the FCC on the commercial spectrum licensee